of being solid with *F,* and in some cases adjustable. Of course, these variations in design depend upon the conditions involved, but the principles remain the same. The jig or jigs are held to the machine on which they are used by clamping arrangements of suitable type.

Jigs for Supporting Bar on One Side of Hole Only. — The type of boring jigs previously described supports the bar in two or more places, and the cutting tools are placed at certain predetermined distances from the ends of the bars, depending upon the shape and size of the work. Sometimes it may prove necessary, however, to have a cutting tool inserted just at the end of the bar. For example, a boring jig may consist of

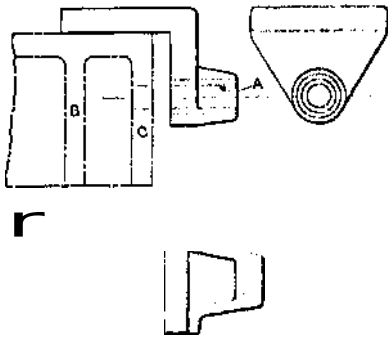

Fig. 4. Examples of Guiding Arrangements wh©r© no Support is obtainable on One Side of Hole to be bored

simply one bracket as shown at the left in Fig. 4, A very long bearing *A* is then provided so as to guide the bar true. The arrangement shown at the right in Fig. 4 is sometimes used to insure a long bearing for the bar. A special bracket *K* is mounted on the jig and borecl out at the same time as the jig proper is machined. This provides, in effect, two bearings. In these cases bars with a cutting tool at the end are used. There are several reasons why a boring jig of this kind may be required. For instance, there is a wall *B* immediately back of the wall C in which the hole is to be borecl Other obstacles may be in the way to prevent placing a bearing on one side of the hole to be finished. Instead of having a space *D* between the jig and the work, the jig can oftentimes be brought up close to the work and clamped to it from the bushing side.

Each of the different holes in boring jigs has, of course, its own outfit of boring-bars, reamers, and facing tools. In making